

WHAT IS CLAIMED IS:

1. An electrical shift and brake control device comprising:
 - a brake lever bracket configured to be mounted to a handlebar, the brake lever bracket including an inner side wall, an outer side wall, a front wall and a bottom wall;
 - a brake lever coupled to the brake lever bracket; and
 - an electrical shift control switch fixedly mounted to at least one of the inner side wall, the outer side wall, the front wall and the bottom wall of the brake lever bracket, the electrical shift control switch including an operating member arranged and configured to move relative to the brake lever bracket between a first actuating position and a second actuating position.

2. The electrical shift and brake control device according to claim 1, wherein
the electrical shift control switch is further arranged and configured to include a neutral position with the operating member being further arranged and configured to move relative to the brake lever bracket between the neutral position and the first and second actuating positions.

3. The electrical shift and brake control device according to claim 2, wherein
the electrical shift control switch further includes a biasing element arranged and configured to urge the operating member to the neutral position.

4. The electrical shift and brake control device according to claim 1, wherein
the operating member of the electrical shift control switch is further arranged and configured to rotate relative to the brake lever bracket about a rotationally operating axis that is not parallel to a brake operating plane of the brake lever in which the brake lever is arranged to move between a rest position and a braking position.

5. The electrical shift and brake control device according to claim 1, wherein

the operating member of the electrical shift control switch is further arranged and configured to move in a linear sliding manner relative to the brake lever bracket between the first and second actuating positions.

6. The electrical shift and brake control device according to claim 1, further comprising

an additional electrical shift control switch fixedly mounted to the brake lever.

7. The electrical shift and brake control device according to claim 1, wherein

the electrical shift control switch further includes

a first stationary contact having a first stationary engagement surface,
a first movable contact having a first movable engagement surface, the first movable contact being arranged and configured to be moved by the operating member such that the first movable engagement surface moves into electrical engagement with the first stationary engagement surface upon movement of the operating member to the first actuating position,

a second stationary contact having a second stationary engagement surface,

a second movable contact having a second movable engagement surface, the second movable contact being arranged and configured to be moved by the operating member such that the second movable engagement surface moves into electrical engagement with the second stationary engagement surface upon movement of the operating member to the second actuating position.

8. The electrical shift and brake control device according to claim 7, wherein

the electrical shift control switch further includes a biasing element arranged and configured to urge the operating member to a neutral position.

9. The electrical shift and brake control device according to claim 7, wherein

the electrical shift control switch further includes a clicking element arranged and configured to produce an audible sound that occurs upon selective movement of the operating member to either of the first and second actuating positions.

10. The electrical shift and brake control device according to claim 1, wherein

the electrical shift control switch further includes

a first stationary contact having a first stationary engagement surface,

a second stationary contact having a second stationary engagement surface,

a movable contact having a movable engagement surface, the movable contact being arranged and configured to be moved by the operating member such that the movable engagement surface selectively moves into electrical engagement with the first stationary engagement surface upon movement of the operating member to the first actuating position, and moves into electrical engagement with the second stationary engagement surface upon movement of the operating member to the second actuating position.

11. The electrical shift and brake control device according to claim 10, wherein

the movable contact is arranged and configured such that the movable engagement surface moves into electrical engagement with the first stationary engagement surface with the movable engagement surface sliding across the first

stationary engagement surface when the operating member moves to the first actuating position, and moves into electrical engagement with the second stationary engagement surface with the movable engagement surface sliding across the second stationary engagement surface when the operating member moves to the second actuating position.

12. The electrical shift and brake control device according to claim 10, wherein

the movable contact is fixedly coupled to the operating member to rotate about a rotationally operating axis of the operating member.

13. An electrical shift and brake control device comprising:
a brake lever bracket configured to be mounted to a handlebar;
a brake lever coupled to the brake lever bracket to move along a brake operating plane; and

an electrical shift control switch including an operating member, the electrical shift control switch being at least one of

mounted to the brake lever with the operating member of the electrical shift control switch arranged and configured to rotate relative to the brake lever about a first rotationally operating axis that is not perpendicular to the brake operating plane, and
mounted to the brake lever bracket with the operating member of the electrical shift control switch arranged and configured to rotate relative to the brake lever bracket about a second rotationally operating axis that is not parallel to the brake operating plane.

14. The electrical shift and brake control device according to claim 13, wherein

the first rotationally operating axis and the brake operating plane intersects at an angle less than 45 degree.

15. The electrical shift and brake control device according to claim 13, wherein

the first rotationally operating axis is substantially parallel with respect to the brake operating plane.

16. The electrical shift and brake control device according to claim 13, wherein

the operating member of the electrical shift control switch is fixedly mounted to the brake lever with the operating member of the electrical shift control switch arranged and configured to rotate relative to the brake lever about the first rotationally operating axis that is substantially parallel with respect to the brake operating plane.

17. The electrical shift and brake control device according to claim 13, wherein

the operating member of the electrical shift control switch is fixedly mounted to the brake lever bracket with the operating member of the electrical shift control switch arranged and configured to rotate relative to the brake lever about a second rotationally operating axis that is not parallel to the brake operating plane.

18. The electrical shift and brake control device according to claim 13, wherein

the operating member of the electrical shift control switch is fixedly mounted to the brake lever with the operating member of the electrical shift control switch arranged and configured to move along a plane angled with respect to the brake operating plane relative to the brake lever.

19. The electrical shift and brake control device according to claim 13, wherein

the electrical shift control switch is further arranged and configured to include a first actuating position and a second actuating position, the operating member being further arranged and configured to move between the first and second actuating positions.

20. The electrical shift and brake control device according to claim 19, wherein

the electrical shift control switch further includes a biasing element arranged and configured to urge the operating member to a neutral position located between the first and second actuating positions.

21. The electrical shift and brake control device according to claim 16, further comprising

an additional electrical shift control switch fixedly mounted to a lateral side of the brake lever bracket.

22. The electrical shift and brake control device according to claim 21, wherein

the additional electrical shift control switch includes an additional operating member arranged and configured to operate substantially identically as the operating member of the electrical shift control switch mounted to the brake lever.

23. The electrical shift and brake control device according to claim 17, further comprising

an additional electrical shift control switch fixedly mounted to a rearward side of the brake lever.

24. The electrical shift and brake control device according to claim 23, wherein

the additional operating member of the additional electrical shift control switch is arranged and configured to operate substantially identically as the operating member of the electrical shift control switch mounted to the brake lever bracket.

25. The electrical shift and brake control device according to claim 18, further comprising

an additional electrical shift control switch fixedly mounted to a lateral side of the brake lever bracket.

26. The electrical shift and brake control device according to claim 25, wherein

the additional electrical shift control switch includes an additional operating member arranged and configured to operate substantially identically as the operating member of the electrical shift control switch mounted to the brake lever.

27. The electrical shift and brake control device according to claim 19, wherein

the electrical shift control switch further includes

a first stationary contact having a first stationary engagement surface,

a first movable contact having a first movable engagement surface, the first movable contact being arranged and configured to be moved by the operating member such that the first movable engagement surface moves into electrical engagement with the first stationary engagement surface upon movement of the operating member to the first actuating position,

a second stationary contact having a second stationary engagement surface,

a second movable contact having a second movable engagement surface, the second movable contact being arranged and configured to be moved by the operating member such that the second movable engagement surface moves into electrical engagement with the second stationary engagement surface upon movement of the operating member to the second actuating position.

28. The electrical shift and brake control device according to claim 27, wherein

the electrical shift control switch further includes a biasing element arranged and configured to urge the operating member to a neutral position.

29. The electrical shift and brake control device according to claim 27, wherein

the electrical shift control switch further includes a clicking element arranged and configured to produce an audible sound that occurs upon selective movement of the operating member to either of the first and second actuating positions.

30. The electrical shift and brake control device according to claim 19, wherein

the electrical shift control switch further includes

a first stationary contact having a first stationary engagement surface,

a second stationary contact having a second stationary engagement surface,

a movable contact having a movable engagement surface,

the movable contact being arranged and configured to be moved by the operating member such that the movable engagement surface selectively moves into electrical engagement with the first stationary engagement surface upon movement of the operating member to the first actuating position, and moves into electrical engagement with the second stationary engagement surface upon movement of the operating member to the second actuating position.

31. The electrical shift and brake control device according to claim 30, wherein

the movable contact is arranged and configured such that the movable engagement surface moves into electrical engagement with the first stationary engagement surface with the movable engagement surface sliding across the first stationary engagement surface when the operating member moves to the first actuating position, and moves into electrical engagement with the second stationary engagement surface with the movable engagement surface sliding across the second stationary engagement surface when the operating member moves to the second actuating position.

32. The electrical shift and brake control device according to claim 31, wherein

the movable contact is fixedly coupled to the operating member to rotate about a rotationally operating axis of the operating member.

33. An electrical shift and brake control device comprising:
a brake lever bracket configured to be mounted to a handlebar;
a brake lever coupled to the brake lever bracket; and
an electrical shift control switch including an operating member, the electrical shift control switch being at least one of

mounted to the brake lever with the operating member of the electrical shift control switch arranged and configured to move in a linear sliding manner between a first relative position and a second relative position, and

mounted to the brake lever bracket with the operating member of the electrical shift control switch arranged and configured to move in a linear sliding manner relative to the brake lever bracket between a first actuating position and a second actuating position.

34. The electrical shift and brake control device according to claim 33, wherein

the electrical shift control switch is arranged and configured such that the first and second relative positions correspond to move the first actuating position and the second actuating position.

35. The electrical shift and brake control device according to claim 34, wherein

the electrical shift control switch is further arranged and configured to include a neutral position located between the neutral position and the first and second actuating positions, the operating member being further arranged and configured to move between the neutral position and the first and second actuating positions.

36. The electrical shift and brake control device according to claim 35, wherein

the electrical shift control switch further includes a biasing element arranged and configured to urge the operating member to the neutral position.

37. The electrical shift and brake control device according to claim 34, wherein

the electrical shift control switch is fixedly mounted to the brake lever.

38. The electrical shift and brake control device according to claim 37, wherein

the operating member of the electrical shift control switch is arranged and configured to project laterally and outwardly from a longitudinal side edge of the brake lever.

39. The electrical shift and brake control device according to claim 38, wherein

the operating member of the electrical shift control switch is arranged and configured to slide along a longitudinal direction of the brake lever.

40. The electrical shift and brake control device according to claim 37, further comprising

an additional electrical shift control switch fixedly mounted to the brake lever bracket.

41. The electrical shift and brake control device according to claim 40, wherein

the additional operating member of the additional electrical shift control switch is arranged and configured to operate substantially identically as the operating member of the electrical shift control switch mounted to the brake lever.

42. The electrical shift and brake control device according to claim 34, wherein

the electrical shift control switch is fixedly mounted to a lateral side of the brake lever bracket.

43. The electrical shift and brake control device according to claim 42, further comprising

an additional electrical shift control switch fixedly mounted to a rearward side of the brake lever.

44. The electrical shift and brake control device according to claim 43, wherein

the additional operating member of the additional electrical shift control switch is arranged and configured to slide in a linear sliding manner along the brake lever so as to operate substantially identically as the operating member of the electrical shift control switch mounted to the brake lever bracket.

45. The electrical shift and brake control device according to claim 44, wherein

the additional operating member of the additional electrical shift control switch is arranged and configured to project laterally and outwardly from a longitudinal side edge of the brake lever.

46. The electrical shift and brake control device according to claim 45, wherein

the additional operating member of the additional electrical shift control switch is arranged and configured to slide along a longitudinal direction of the brake lever.

47. The electrical shift and brake control device according to claim 34, wherein

the electrical shift control switch further includes
a first stationary contact having a first stationary engagement surface,

a first movable contact having a first movable engagement surface, the first movable contact being arranged and configured to be moved by the operating member such that the first movable engagement surface moves into electrical engagement with the first stationary engagement surface upon movement of the operating member to the first actuating position,

a second stationary contact having a second stationary engagement surface,

a second movable contact having a second movable engagement surface, the second movable contact being arranged and configured to be moved by the operating member such that the second movable engagement surface moves into electrical engagement with the second stationary engagement surface upon movement of the operating member to the second actuating position.

48. The electrical shift and brake control device according to claim 47, wherein

the electrical shift control switch further includes a biasing element arranged and configured to urge the operating member to a neutral position.

49. The electrical shift and brake control device according to claim 47, wherein

the electrical shift control switch further includes a clicking element arranged and configured to produce an audible sound that occurs upon selective movement of the operating member to either of the first and second actuating positions.